Stypandra jamesii (Phormiaceae), a new Western Australian species endemic to granite outcrops

Blindgrass or Nodding Blue Lily, as presently conceived (Henderson 1987), comprises a single variable species in a monotypic genus. *Stypandra glauca* R.Br. occurs in south-western and south-eastern Australia, and possibly in New Caledonia, embracing a considerable diversity of growth forms, from large erect bamboo-like clumps up to 2 m tall, to prostrate sprawling herbs. All have nodding flowers, usually royal blue, but sometimes white along the Darling Range near Perth and near Hyden. Some populations in southern Western Australia are poisonous, causing blindness to livestock if eaten. No such poisonous attributes are known from the south-east.

Chromosome numbers in *Stypandra glauca* were documented by Keighery (1984), Henderson (1987), and Russell (1988), the latter in an honours research project supervised by Associate Professor Sid James of The University of Western Australia. Populations with 8 and 16 pairs of chromosomes occur in south-western Australia, while counts of only 8 pairs have been recorded from plants in south-eastern Queensland and in the Australian Capital Territory near Canberra. This geographical pattern suggests that 8 pairs is the ancestral number of the complex.

Within south-western Australia, there is no clear geographical separation of populations with 8 and 16 pairs of chromosomes. With one possible exception (Sullivan Rock), no case was found where both chromosome numbers occurred together among plants on the same rock. Both chromosome number races extend from granites in the Darling Range near Perth, eastwards through the wheatbelt, and along the south coast on outcrops between Albany and Bremer Bay. Polyploidy may be a recurrent solution to the genetic difficulties posed by inbreeding in small isolated populations of *Stypandra glauca* with the ancestral 8 pairs of chromosomes. Russell (1988) found that substantial levels of pollen sterility occur in the species, possibly due to inbreeding effects. He proposed that polyploidy masks some of the genes causing lethality and restores fertility. A detailed study of population relationships in *Stypandra glauca* using DNA markers would enable a clear understanding of evolutionary processes leading to the complex variation shown by this widespread granite outcrop perennial herb.

The chromosomal variation in south-west populations of *Stypandra glauca* is matched by complex morphological variation. Henderson (1987) summarized the situation succinctly:

> "An extremely variable species which on presently available herbarium material cannot unequivocally be subdivided, though extreme forms are very distinctive. Some have been treated as species but many specimens show intermediate characters or both states of so-called distinctions.
>
> W.A. material (or parts of it) may be subspecifically or specifically distinct from eastern and south-eastern material. ... The names *Stypandra imbricata* and *S. grandiflora* were applied to young or old ± low plants with medium to broad leaf laminas in south-western W.A.; *S. virgata* was applied to older, taller plants with narrow leaf laminas and *S. scoparia* to old tall plants with short filiform leaves in this same region. *S. propinqua*, applied to young plants with comparatively narrow leaves, and *S. latifolia*, to young plants with very broad leaves occurring in eastern Australia, are unquestionably synonyms of *S. glauca*."

My own field studies over the past two decades support Henderson's views on morphological variation in *Stypandra glauca*. Populations tend to be of a uniform morphology, age-related features aside, but substantial variation occurs from rock to rock as one moves across the south-west Australian

landscape. There may be a geographical basis to some of this variation, but rigorous quantitative studies are needed to resolve the situation. However, there is one atypical variant on granite outcrops in the eastern wheatbelt, first collected by Professor Robert Ornduff in 1983 and then by Associate Professor Sid James in 1988. This variant has small white flowers, a sprawling habit, and is sympatric with larger erect blue-flowered specimens, thicker stemmed and smaller leaved, typical of many populations of *Stypandra glauca*. No intermediates have been found where these two taxa are sympatric. Consequently, I regard this white-flowered effuse taxon as a distinct species.

Stypandra jamesii Hopper, *sp. nov.*

A *S. glauca* R. Br. caulia effusia gracilioribus, floribus minoribus cremeis et antherica minoribus, differt.

Typus: Wave Rock [Hyden Rock], Western Australia, 12 October 1991, *W. Greuter* 22709 (*holo:* PERTH 03456668).

Effuse, sprawling rhizomatous *perennial herb*; roots fibrous; tufts to more than 1 m across at base; aerial stems to 30 cm high, thin, to *c.* 1 mm diameter, elongated, leafy throughout. *Leaves* numerous, ascending, soft, linear, 2–15 cm long, to 3 mm wide, base sheathing, cylindrical then equitant above, apex acute. *Upper bracts* linear-subulate, 1–2.5 cm long. *Inflorescence* terminal, open, cymose, few-flowered. *Flowers* actinomorphic, nodding to erect, on slender pedicels 3–18 mm long. *Perianth* creamy white; segments 6, free, subequal, spreading, broadly linear, to 5 x 2 mm, usually 5-nerved. *Stamens* 6, shorter than perianth, 2–3 mm long; filaments slender, becoming kinked below middle, densely hairy distally; anthers slender, yellow, ± tapered upwards, dehiscing longitudinally by slits, recurved or coiled after dehiscence, *c.* 1 long before coiling. *Ovary* superior, *c.* 1 mm long. *Style* filiform, 2–3 mm long; stigma minute, papillose. *Capsule* not seen.

Specimens examined. WESTERN AUSTRALIA: Hyden Rock, 18 Oct. 1989, *S.D. Hopper* 7704 (PERTH); Graham Rock, 17 km E of Hyden, 1 Oct. 1990, *S.D. Hopper* 7861 (PERTH); Graham Rock, late Sep. 1988, *S.H. James for J. Russell* 35 (PERTH); Hyden Rock, 4 Oct. 1983, *R. Ornduff* 9307–74 (PERTH).

Distribution. Known only from Hyden Rock and Graham Rock over a narrow 15 km range in the eastern wheatbelt of south-western Australia.

Habitat. Grows in partial shade on the margins of *Allocasuarina huegeliana* low woodlands and in open low scrub at the base of, or in shallow soil pockets on, large granite inselbergs. Associated species include *Leptospermum erubescens*, *Dodonaea viscosa* subsp. *attenuata*, *Melaleuca elliptica*, *Thryptomene australis*, *Acacia lasiocalyx*, *Eucalyptus loxophleba* subsp. *loxophleba*, *Cheilanthes austrotenuifolia*, *Spartochloa scirpoidea* and *Santalum acuminatum*.

Phenology. Flowers in October, possibly into November.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority Two.

Etymology. Named for the late Associate Professor Sidney H. James, my respected mentor, Ph.D. supervisor, and friend, for his outstanding research on the evolutionary genetics of the Western

Australian flora, and his fine abilities to inspire generations of students (Hopper 1996). *Stypandra jamesii* was collected by Sid, who most probably recognized it as new, given that he made relatively few herbarium collections and considered this taxon important enough to do so.

Notes. Stypandra jamesii differs from *S. glauca* most noticably in its sprawling low habit, effuse thinner less woody stems, long narrow leaves and its smaller consistently cream flowers. Elsewhere I have seen effuse sprawling long-leaved plants of *S. glauca* only near Cataby in sandy soils beneath *Eucalyptus wandoo* woodland and on the Swan Coastal Plain in *Eucalyptus gomphocephala* woodland (e.g. *J. Russell* 34), but these plants retained the larger blue flowers typical of the species. Usually, *S. glauca* has erect stems, like miniature bamboo, up to 2 m tall. The white-flowered variants of *S. glauca* on the Darling Scarp retain this typical habit, and have larger flowers than those of *S. jamesii.*

The two species are sympatric at Hyden Rock and Graham Rock, where *S. glauca* has typical large blue flowers with perianth segmants to 10 x 3 mm, shorter leaves to 8 cm x 1 mm, and erect robust stems to 4 mm diameter and 2 m tall. No hybrids have been found on these two inselbergs, indicating strong genetic isolation between *S. jamesii* and *S. glauca.* The chromosome number of *S. jamesii* is unknown.

Separate collections of both *Stypandra jamesii* and *S. glauca* were made at Hyden Rock by Professor Robert Ornduff in 1983 (*R. Ornduff* 9307–74 and 9309–32) and by Professor W. Greuter in 1991 (*W. Greuter* 22709 and 22708). This suggests independent recognition of distinct taxa by these botanists, a conclusion I drew and annotated on specimens in October 1989. Undoubtedly, additional taxa are evident in Western Australian *S. glauca* collections. The complex merits further study.

References

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